AEHF

Advanced Extra High Frequency (AEHF) Satellite System

Mission/Vision

The Advanced Extremely High Frequency (AEHF) System is a joint service satellite communications system that provides global, secure, protected, and jam-resistant communications for high-priority military ground, sea, and air assets. The system consists of three satellites in geosynchronous earth orbit (GEO) that provides 10 to 100 times the capacity of the 1990s-era Milstar satellites. A full constellation of three AEHF and one Transformational Communications Satellite (TSAT) will provide continuous 24-hour coverage between 65 degrees north and 65 degrees south latitude.

Advanced EHF allows the National Security Council and Unified Combatant Commanders to control their tactical and strategic forces at all levels of conflict through general nuclear war and supports the attainment of information superiority.

The AEHF System is the follow-on to the Milstar system, augmenting and improving on the capabilities of Milstar, and expanding the MILSATCOM architecture to enable Transformational Communications and Network-Centric Warfare. AEHF will provide connectivity across the spectrum of mission areas, including land, air, and naval warfare; special operations; strategic nuclear operations; strategic defense; theater missile defense; and space operations and intelligence.

Description

The AEHF system is composed of three segments: space (the satellites), terminals (the users) and ground (mission control and associated communications links). The segments will provide communications in a specified set of data rates from 75 bps to approximately 8 Mbps. The space segment consists of a cross-linked constellation of satellites to provide worldwide coverage. The mission control segment controls satellites on orbit, monitors satellite health and provides communication system planning and monitoring. This segment is highly survivable, with both fixed and mobile control stations. System uplinks and crosslinks will operate in the extremely high frequency (EHF) range and downlinks in the super high frequency (SHF) range. The terminal segment includes fixed and ground mobile terminals, ship and submarine terminals, and airborne terminals, including the Family of Advanced Beyond Line-of-Sight - Terminal (FAB–T), used by all of the Services and international partners (Canada, Netherlands and UK.)

The AEHF satellites will respond directly to service requests from operational commanders and user terminals, providing real-time point-to-point connectivity and network services on a priority basis.

On-board signal processing will provide protection and ensure optimum resource utilization and system flexibility among the Armed Forces and other users who operate terminals on land, sea and air. The AEHF system will be integrated into the legacy Milstar constellation, and will be backward compatible with Milstar's low data rate (LDR) and medium data rate (MDR) capabilities, while providing extreme data rates (XDR) and larger capacity at substantially less cost than the Milstar system. Each satellite will be launched on an Evolved Expendable Launch Vehicle (EELV), with the first launch planned for April 2008.

The AEHF Satellite Communications System will augment and replace the Milstar constellation, improve DoD EHF capability and enable Transformational Communications and Network-Centric Warfare. The MILSATCOM Joint Program Office is responsible for development, acquisition and sustainment of the AEHF Program.

General Characteristics

Primary Function:	Near-worldwide, secure, survivable satellite communications
Primary Contractor:	Lockheed Martin Space Systems Company
Satellite Bus:	A2100 line
Weight:	Approximately 14,500 lbs at launch, 9,000 lbs on-orbit
Orbit altitude:	22,300 miles (Geosynchronous)
Payload:	Onboard signal processing, crossbanded EHF/SHF communications
Antennas:	2 SHF Downlink Phased Arrays, 2 Crosslinks, 2 Uplink/Downlink Nulling Antennas, 1 Uplink EHF Phased Array, 6 Uplink/Downlink Gimballed Dish Antenna, 1 Each Uplink/downlink earth coverage horns
Capability:	Data rates from 75 bps to approximately 8 Mbps
No. of Terminals Supported:	6,000
Reconfiguration Time:	Minutes
Launch vehicle:	Delta IV and Atlas V EELVs
Inventory:	3 satellites ordered
Unit Cost:	Approximately $580 million per satellite

Advanced EHF

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